

**ARIZONA STRIP DISTRICT
PINYON – JUNIPER TREATMENT DEMONSTRATION PROJECT
ENVIRONMENTAL ASSESSMENT
EA-AZ-010-03-14
MAY 2003**

INTRODUCTION

The Northern Arizona University Ecological Restoration Institute is proposing to treat up to 25 acres of pinyon-juniper woodland on public land administered by the Bureau of Land Management in order to study the effects of mechanical and prescribed fire treatments on woodland ecosystem function.

Background

Pinyon-juniper woodlands are estimated to cover approximately 22.5 million hectares (55.6 M acres) in the western United States. Around 9 million hectares (22.2 M acres) of pinyon-juniper vegetation occurs in Arizona and New Mexico (Powell et al. 1994). Disturbance patterns and vegetative communities vary considerably across the range of the cover type depending upon site characteristics (e.g., soils, topography) and geographic location. Understory plant communities in pinyon-juniper woodlands can occur in a similarly broad array of associations.

Many pinyon-juniper woodlands show signs of ecological degradation that have been associated with intensive livestock grazing, fire exclusion and other land uses associated with Euro-American settlement of the region ca. 1870 (Jacobs and Gatewood 1999, Brockway et al. 2002). Increases in overstory density, in terms of both tree numbers and sizes, has led to decreased abundance and richness of understory species, depletion of soil seed banks, and severe topsoil erosion (Tausch et al. 1981, Jacobs and Gatewood 1999). Fuel buildup resulting from fire exclusion has put many woodlands at risk of high-intensity, stand-replacing wildfires (Gruell 1999). After such intense disturbance further site degradation, in terms of soil loss, exotic species invasion, and type conversion, can occur (Jacobs and Gatewood 1999, Goodrich and Rooks 1999). Degradation of these ecosystems represents not only a loss of habitat for naturally occurring woodland species but also a diminishment of natural resource options for both current and future human generations. In order to halt degradation processes, reestablish woodland structure, and return sustainable ecosystem function, experimental restoration treatments have been designed.

Conformance with Land Use Plan

The Proposed Action and No Action Alternative described in this environmental assessment have been reviewed to determine if they conform with the land use plan terms and conditions as required by 43 Code of Federal Regulations (CFR) 1610.5. The proposed action and alternative action have been found to be in conformance with the Arizona Strip Resource Management Plan (RMP) and Final Environmental Impact Statement (EIS) of 1992, as amended (1998).

Management actions discussed in this environmental assessment fully reflect the intent of the following decisions found in the Arizona Strip District RMP Implementation Plan of 1992:

CL05 Surface disturbing activities on public land will be reviewed for cultural values by a cultural resource specialist or a permitted archeologist hired by an applicant.

FW01 Develop and implement activity plans directed toward managing, maintaining and protecting . . . forest ecosystems located outside wilderness areas. Management direction would be to maintain healthy,

viable and biologically diverse forest ecosystems that will meet the needs of wildlife, recreation, livestock grazing, watershed and other resources.

FW02 Commercial forestry or timber harvest are not objectives for resource management. Management programs may, however, include ecologically sound and carefully managed silvicultural practices. Management practices that could be used to enhance other resource values and accomplish activity plan objectives include:

1. Disease and insect control, if serious need is demonstrated.
2. Selective thinning necessary for the health, vigor, regeneration or biological diversity of the forest ecosystem.
3. Salvaging or harvest and rehabilitation of burned areas, diseased or insect killed areas.
4. Reduction of fuel.
5. Prescribed burns.
6. Prescribed management of naturally occurring fires.

FW03 Utilize personal and commercial woodland harvest activities to achieve other resource program goals and objectives.

FW04 In forest management activities, ensure protection of natural aesthetics, recreation, special status species, cultural resources, and other multiple-use values.

FW08 Protect forests from catastrophic fires while managing prescribed burns or naturally occurring fires within established prescriptions to reduce fuel buildup, maintain healthy species composition and benefit wildlife habitat, watershed cover and livestock forage.

TE01 Carry out management consistent with multiple use for conservation of candidate species and their habitats and ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered.

TE02 Prior to surface disturbing activity on public land a special status species review will be conducted by a qualified specialist.

WS01 Manage vegetation cover towards ecological stability and sound long-term protective soil cover using mechanical, chemical, biological or fire as tools for accomplishment.

WL07 Manage wildlife habitat through the Habitat Management Plan process to achieve desired plant community objectives; practices used to accomplish this could include mechanical treatments, livestock grazing, herbicide applications, prescribed and natural fire, reseeding and water developments.

Relationship to Laws, Regulation and Other Plans

The Proposed Action and Alternative Action described and analyzed in this document are in compliance with the Endangered Species Act of 1973 as Amended, section 106 of the National Historic Preservation Act of 1966, the Archaeological Resources Protection Act of 1979, the Federal Land Policy and Management Act of 1976, the National Environmental Policy Act of 1969 and Arizona Department of Environmental Quality regulations regarding air quality.

The Federal Land Policy and Management Act (FLPMA) of 1976 mandates that BLM manage public lands for multiple uses on a sustained yield basis. Various program-specific activity plans dealing with vegetation, wildlife, wilderness areas, and fire have guided management actions in this ecosystem. Guidance from these activity plans is incorporated in the Proposed Action.

The Proposed Action would be in compliance with the Arizona Standards and Guidelines for Rangeland Health:

Standard 1/Upland Sites: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform (ecological site).

Standard 2/Riparian-Wetland Sites: Riparian-wetland areas are in properly functioning condition. (not applicable – there are no riparian/wetland sites involved).

Standard 3/Desired Plant Communities: Productive and diverse upland and riparian-wetland plant communities of native species exist and are maintained.

Issues

Impact on wildlife
Impact on visual resources
Impact on vegetation
Impact on soils
Impact on cultural resources
Buildup of hazardous fuels
Scientific basis for woodland management

PROPOSED ACTION AND ALTERNATIVE

Normally, when BLM analyzes a proposal, alternative methods to achieve the purpose are considered. The proposal for this project is to conduct a specific treatment in order to understand the effects of said treatment. Therefore, there is no alternative treatment identified (other than the No Action Alternative).

PROPOSED ACTION

Research Purpose

Ecological restoration of pinyon-juniper woodlands would be demonstrated on two BLM administered sites on the Arizona Strip District near Mount Trumbull in northwest Arizona. The project would scientifically test technical frameworks previously established for forest restoration (see Waltz et al. 2001). Restoration treatments were developed in accordance with site reference conditions gained by examining pretreatment conditions, evidence of ecological legacies, and review of information concerning attributes of nearby relict areas. Treatments fundamentally focus on retention of trees established prior to 1870, replacement of dead trees (evidence) that were likely members of the pre-1870 (approximate onset of changes associated with livestock grazing and fire exclusion) woodland, mechanical thinning of young trees, and application of prescribed fire for fuel management and ecological process objectives. Restoration of understory community composition would be accomplished by seeding the site with native herbaceous and woody plants. Livestock grazing would be excluded on the sites for at least two years post-treatment. Information generated from this project would be used in conjunction with findings from similar experiments conducted elsewhere to increase our understanding of management options for pinyon-juniper ecosystems.

The objectives of the demonstration are to do the following: (1) study the ecological outcomes of applying restoration-based treatments that primarily include reducing stand density to levels similar to reference conditions, reintroducing periodic fire as a natural disturbance process as appropriate, and seeding with native plants to regain understory diversity and structure; (2) use restoration treatments to increase understory productivity and diversity as compared with untreated control units; (3) identify constraints and limitations of restoration treatments; (4) to establish protocols for long-term monitoring of

pinyon-juniper restoration projects; (5) to increase public awareness of ecological restoration needs in pinyon-juniper woodlands; (6) to create a site where interested groups could visually assess structural and functional differences between degraded and restored woodlands.

The demonstration would be conducted at two sites on public lands administered by BLM; the project area is near Mt Trumbull **outside the Grand Canyon-Parashant National Monument**. Site 1 is located along Mohave County Road 1530, approximately 2.5 miles north of Nixon Spring Station, at latitude 36N 26' 01" and longitude 113W 09' 40" (T 35 N, R 8 W, Section 17, see attached map). Right-of-way width for Mohave County Road 1530 is 70 feet; 35 each side of center. Site 2 is located just north of Potato Valley, off Mohave County Road 5, at latitude 36N 24' 46", and longitude 113W 12' 15" (T 35 N, R 9 W, Section 24). Right-of-way width for Mohave County Road 5 is 100 feet; 50 feet each side of center. Elevation of the sites ranges approximately 1900-1950 m (6270-6435 ft) above seas level. Overstories are all-aged mixtures of pinyon pine (*Pinus edulis*) and juniper (*Juniperus osteosperma*). Understory communities are sparse but comprised of blue grama (*Bouteloua gracilis*), buckwheat (*Eriogonum* spp.), oak brush (*Quercus turbinella*), cliffrose (*Purshia mexicana*), and cacti. Soils at both sites are coarse and derived from volcanic parent material.

Ecological Restoration and Adaptive Management

Ecological Restoration is defined as “the process of assisting the recovery and management of ecological integrity. Ecological integrity includes a critical range of variability in biodiversity, ecological processes and structures, regional and historical context, and sustainable practices.” (SER 1996). This framework implies that ecosystems are comprised of organisms adapted to specific processes functioning within bounded ranges of variability over periods of evolutionary time (note: this does not imply ecological stasis) (Moore et al. 1999). Degradation and species loss are characteristic of ecosystems that have been rapidly changed, often due to human activities, to take on functional characteristics outside long-term ranges of natural variability. Thus, reestablishing ecological attributes similar to those occurring prior to degradation provides the greatest hope for sustaining the broadest range of species.

Restoring ecological integrity to degraded ecosystems involves several steps. Primarily, efforts are focused on restoration of ecosystem structure, composition, and key processes. Restoration of ecosystem structure includes reestablishing number, spatial arrangement, and representative size distribution of key ecosystem elements. Reintroduction of important and common species can restore ecosystem composition. Natural disturbance processes can be restored in several ways including allowing occurrence (e.g., prescribed wildfires), applying disturbance processes under controlled conditions (e.g., prescribed fire), and using mechanical treatments (e.g., tree thinning) to simulate disturbance. Important in the restoration process is identification of reference points that guide the formulation of treatment prescriptions. These points are typically termed “reference conditions” and are based on best possible information regarding ecosystem attribute prior to degradation (Moore et al. 1999). Information regarding structural attributes, community composition, ecosystem dynamics, and disturbance processes can be gained through various sources. Historical records, on-site physical evidence, ecological legacies, and relict areas represent a number of these sources of information.

To date, management aimed at improvement of pinyon-juniper woodlands has, to a large extent, focused on enhancing range for wildlife and livestock and to improve soils and watershed condition. Treatments to reduce overstory density and increase understory production commonly included indiscriminant removal of pinyon and juniper trees (e.g., “chaining”) and sowing ranges with exotic forage species. Documentation of pretreatment conditions and post-treatment monitoring of outcomes has often been minimal. Only recently have techniques to reestablish ecological integrity of pinyon-juniper ecosystems been tested (Jacobs and Gatewood 1999, Goodloe 1999, Stevens 1999, Brockway et al. 2002, Jacobs 2002). Selective tree thinning and prescribed fire were used in most of these studies in order to restore overstory conditions, reduce woody fuels (live and dead), and reinitiate natural disturbance processes (Jacobs and Gatewood 1999, Brockway et al. 2002, Jacobs 2002). Sowing with native understory species

has been tested to some degree (Stevens 1999, Jacobs and Gatewood 1999). These studies have indicated that ecological function can be rapidly restored to degraded pinyon-juniper ecosystems.

Pretreatment Sampling

In spring 2002, both sites were intensively sampled for pretreatment structure and composition. Sampling methods followed procedures currently in use on experimental sites in ponderosa pine (*Pinus ponderosa* Laws.) forests at Grand Canyon-Parashant National Monument (see Waltz et al. 2001). Modifications to these protocols were made appropriate to assessment of pinyon-juniper woodlands.

Sites were delineated into “North” and “South” units (two units per site; see Treatments). Six 0.04-ha plots (0.1 acre) were established on a 60-m (196.8 ft) grid in each unit. Plot centers were established with steel stakes and geo-referenced for long-term monitoring. Overstory, understory, and fuels data were recorded in order to describe pretreatment structure, composition, and response to restoration treatments. Additionally, photopoints were established to document visual changes over time.

All live trees greater than breast height (1.37 m (4.5 ft)) on plots were tallied by species and measured for total height. Pinyon and juniper stems were measured for diameter at root collar (DRC; measured at soil surface) and tagged for remeasurement. Crown base heights were measured and crown volume (% live foliage) was estimated. All trees, live and dead, were preliminarily classified as pre- or post-settlement in age based on DRC measurement. Trees greater than 20 cm (7.87 in.) were classified as presettlement whereas those less than 20 cm were called post-settlement (Barger and Ffolliott 1972). Subsequent research would examine the effectiveness of age classifications based on DRC, height, bark characteristics, and crown form (*sensu* Bradshaw and Reveal 1943, Blackburn and Tueller 1970). For live trees classified as presettlement, increment cores taken at DRC were collected. Increment cores were collected from an additional 20% random subsample of post-settlement trees. Dead tree structures (i.e., snags, logs, stumps) were tallied by condition class as described by Thomas et al. (1979) and Maser et al. (1979) for ponderosa pine and measured for DRC.

Understory transects (50 m (164 ft)) oriented parallel to the plot slope and centered on plot centers (i.e., 25 m (82 ft) above and below plot centers) were established at each plot. Transect endpoints were established with steel stakes for long-term monitoring. Along transects on alternating sides, 1-m square plots were placed at 5-meter (16.4 ft) intervals (10 plots per transect). On each of these small plots, cover of herbaceous (non-woody) plant species was recorded. Transects were used as centerlines for 10-m (32.8 ft) wide sampling belts. Within transects, lists of plant species were made. Tree seedlings (< 1.37 m (4.5 ft)) and shrubs were tallied on a 100-m² (0.025 ac) plot nested within the larger overstory plot. Soil samples were collected at four points 11.28 m (37 ft) from plot centers on cardinal directions. Samples were placed in coolers and returned to the laboratory for analysis of seed bank and mycorrhizae potential. Dead woody fuels were tallied and forest floor depth measured on 15.24-m (50 feet) transects established in a random direction from plot centers. Two photopoints per plot were established at north and east points on the overstory plot perimeter. Photographs were taken toward plot center with the horizon located in the lower 1/3 of the field of view.

Treatments

Ecological restoration treatments applied to approximately 12 acres at each of the demonstration units would include the following:

- 1) retention of pre-1870 trees
- 2) replacement of 1870 structural evidence
- 3) thinning of young pinyon and juniper trees using chainsaws or mechanical equipment
- 4) placement of thinning slash (tops and limbs) in canopy openings
- 5) seeding with native plant species
- 6) prescribed burning to reduce woody fuels and stimulate understory production.

These treatments were developed using information from the following sources:

- 1) comparison of historical (1940) and contemporary (1994) aerial photographs
- 2) analysis of pre-treatment data collected at the two sites, particularly tree age, understory plant frequency, and seed bank data
- 3) information regarding structural and compositional characteristics of nearby pinyon-juniper relict sites (Schmutz et al 1967, Thatcher and Hart 1974, Rowlands and Brian 2001)
- 4) information from other pinyon-juniper restoration studies in the Southwest;
- 5) information from restoration studies in ponderosa pine ecosystems (Covington et al. 1997, Fulé et al. 2001); and
- 6) extensive review of literature concerning pinyon-juniper ecosystems.

Additional information gained through the adaptive process and further studies would be used in continued post-site management of these sites.

To reestablish overstory structure to pre-1870 characteristics a thinning prescription was designed with the following key elements:

- 1) retain all live presettlement trees
- 2) replace pre-1870 tree evidence at rate of 1:2. Live trees would be assumed to be pre-1870 in origin if greater than 20 cm DRC. Trees used for replacement of pre-1870 evidence would be selected based on species, size, and vigor within a radius of 6 m (19.68 ft) (presumably double the typical crown radius of mature pinyon or juniper tree) of each pre-1870 tree structure (snag, log, stump, stump hole > 20 cm DRC). If suitable replacement trees were not found within this radius, the search would be expanded to 9 m (29.52 ft). Trees would be marked for retention and all other pinyon and juniper trees would be removed. Only pinyon and juniper would be cut.

Large (≥ 10 cm (3.9 in.) diameter) woody fuels generated by thinning could be sold (or given away for free) as fuel wood. Finer fuels would be lopped to approximately 1 m (3.3 ft) in length and scattered in canopy openings to promote plant establishment, add nutrients and organic matter to soils, and reduce erosion (Jacobs and Gatewood 1999, Brockway et al. 2002).

To restore community diversity, native seeds could be broadcast simultaneously with thinning and slash treatments. Relative proportions of seeded species would reflect information gathered from reference site literature and local expertise. Functional groups sown would include native grasses, forbs, and shrubs. Seeding would coincide with onset of summer rains. Seeding rate and species mix would be determined by availability of resources and costs. Although seed predation is thought to be a serious concern for restoration of pinyon-juniper woodlands, rodent control is not feasible for this demonstration.

Controlled fire would be prescribed if the following were found:

- 1) fire history studies indicate frequent, low-intensity fire was an important attribute in the reference ecosystem;
- 2) fuels management treatments are needed to reduce risk of wildfire and endangerment of resources
- 3) maintenance of biological productivity and diversity characteristics of reference conditions requires periodic disturbance from fire.

Timing and appropriateness of broadcast burning would be determined by understory community development and composition following thinning. Construction of firelines and use of existing fuel breaks would be needed control to broadcast burning. Fire behavior and weather data would be collected during prescribed fires in order to analyze effects on ecosystem components.

Northern Arizona University Ecological Restoration Institute would conduct research and monitoring activities at the site for an indefinite period of time. This would include visits to the site, installation of markers such as rebar and flagging, collection of plant samples, and various measurements.

The mechanical removal of trees would occur in the summer and fall of 2003. Any prescribed burning would be done in the fall of the year.

Any sub-surface or surface archaeological, historical, or paleontological remains discovered during preparation or actual work shall be left intact; all work in the area shall stop immediately and the Field Office Manager shall be notified. Commencement of work shall be allowed upon clearance by the managers in consultation with the Arizona Strip archaeologist.

An additional archaeological survey shall be required in the event the proposed project location is changed, or additional surface disturbing activities are added to the project after the initial survey. Any such survey would have to be completed prior to commencement or continuation of the project.

Upon discovery of any Federally-listed plant or wildlife species on the site, operations would cease until such time as BLM could complete consultation with the US Fish and Wildlife Service under Section 7 of the Endangered Species Act.

NO ACTION ALTERNATIVE

Under the No Action Alternative the proposed treatments would not occur. BLM would continue to manage the area in accordance with the Arizona Strip RMP and associated activity plans.

AFFECTED ENVIRONMENT

For a detailed description of the affected environment, refer the Arizona Strip RMP (1992, as amended, 1998). The following critical elements of the human environment are not present or are not affected by the Proposed Action or No Action Alternative: “ACECs, prime or unique farmlands, floodplains, environmental justice, threatened, endangered, or sensitive species, hazardous or solid wastes, drinking and ground water quality, wetlands and riparian zones, wild & scenic rivers, and wilderness.

The Proposed Action and No Action Alternative are not expected to have any impact on recreation/visitor experience, livestock grazing operations, wild horses and burros, or mineral exploration and development. There are expected to be no socio-economic impacts to the region, other than the information/knowledge gained from this demonstration project.

Parashant National Monument

The proposed project is not within the Parashant National Monument, but is immediately adjacent to it. Presidential Proclamation established the Grand Canyon-Parashant National Monument on January 11, 2000 to preserve and protect geologic treasures and significant archaeological and biological resources.

Air Quality

Air quality is a concern in the region because it directly affects visibility in the Grand Canyon National Park. In the Monument, air quality is fair to excellent depending on prevailing winds. The Mt Trumbull Wilderness Area, approximately one to three miles east of the proposed project site, is designated as a Class I Airshed. The remainder of public lands in the area are designated Class II. Visibility is good, but there are concerns that air quality and visibility are declining. Prevailing winds come from the west and southwest. These winds can carry varying amounts of hydrocarbons and particulate matter from the urban areas of California, Nevada, and Arizona. Smoke from wildfires is a related concern.

Air quality is monitored by the Arizona Department of Environmental Quality, which is responsible for issuing permits for prescribed burning.

Cultural

Cultural resource values in the Mount Trumbull area are diverse and complex, and include archaeological and architectural sites dating from 8,000 BC to the early 20th century. Archaic, Puebloan, Paiute and Euro-american sites can all be identified in the general area. These sites may be anything from artifact scatters to rock art, pueblos, trails, cabins or sawmills.

Native-American use of the area includes the Paiute, Navajo and Hopi. Historic sources document that the Paiute occupied the Mount Trumbull area at the time of Euro-American arrival. Increasing visitation to the area has led to vandalism and unintentional damage to prehistoric and historic cultural sites.

Several cultural sites composed of lithic/pottery scatters were found within the perimeters of the restoration demonstration project described in this document. These were found through intensive, pre-treatment cultural resource inventories (Attached Cultural resource Compliance Documentation Record.)

Visual Resources

The area is designated as Visual Resources Class II, an area that has a high scenic quality. Management objectives in Class II allow subtle changes to the vegetation; changes may be seen but should not attract attention. The project would be visible from portions of the Parashant National Monument.

Noxious Weeds

The major noxious weeds in the area are Scotch thistle (*Onopordum acanthium*) and Field bindweed (*Convolvulus arvensis*). Common Mullein is another weed of concern in the area but is not listed as noxious. Brome and tumbleweeds (Russian thistle) are also present in the area.

Wildlife

Wildlife and their habitats at the project site are managed in accordance with the Mt. Trumbull Habitat Management Plan (1992). Focal species in the HMP are mule deer, Merriam's turkeys, and Kaibab squirrels (which do not occur on the project site).

Over 140 species of birds have been observed within the Mt. Trumbull area. According to O'Brien (1990), the area supports three times the bird numbers as does the Kaibab Plateau because of greater habitat diversity, patchiness, and layering.

Nesting birds, their eggs, and young, but this is a concern directly tied to time of year, specifically spring and early summer. Concern is avoided at other times. This concern would also apply to nesting small mammals and herps, as well. Impacts could come from both mechanical and burning treatments.

Bald eagles, federally listed as threatened, winter in the area. California condors, federally listed as endangered (10j), may occur at any time in the subject area. Neither avian species nests in the area, but could be expected to fly over and feed in the area. Feeding of both would primarily be scavenging. Bald eagles could also hunt birds and animals.

Soil

The soils at sites 1 and 2 are Showlow very cobbly clay loam, 1 to 15 percent slopes on the lower slopes, and Lozinta extremely gravelly loam, 15 to 45 percent slopes on the higher ridges. They are derived from scoriaceous basalt and pyroclastics.

The Showlow soil is deep to very deep and well drained. Sub-surface textures are clay loams, silty clays, and very gravelly clay loams. Permeability is slow and runoff is medium. The hazard of water erosion is moderate and the available water capacity is high.

The Lozinta soils are moderately deep to cinders. Sub-surface textures are extremely gravelly loams. Permeability is moderate and runoff is rapid. The hazard of water erosion is severe and the available water capacity is very low.

Both soils are suitable for woodlands, but production is more limited on the Lozinta soil due to droughtiness. The potential for a diverse understory is higher on the Showlow soil. The soils should be managed to increase the understory and reduce the tree cover, which should reduce runoff and erosion. Surface activities on the Showlow soil should be limited, when it is wet, to prevent compaction.

Vegetation

Preliminary assessments indicate a long-term presence of woodland vegetation at the two sites. Individual pinyon and juniper trees were found with ages of more than 200 years. Tree densities were 1567 and 1755 trees per hectare (634 and 701 trees per acre) on Sites 1 and 2, respectively. Overstory trees comprised less than half the trees on the sites whereas regeneration -- trees less than 1.37 m (4.5 ft) in height -- were dominant in terms of number. Analysis of increment cores showed that pre-1870-aged trees (> 130 years) comprised about 40% of the overstory on Site 1, and 20% on Site 2. Pre-1870 junipers made up 50-75% of the old trees on the sites.

Understory diversity at the sites appeared to be low. Understory cover and species richness were 6% with 38 total species and 2% with 20 species on Sites 1 and 2, respectively. The most common growth forms on both sites were shrubs and perennial forbs. *Cordylanthus parviflorus* (purple bird's beak; an annual forb) and *Pushia mexicana* (Mexican cliffrose) were the most dominate species on the sites. Traces of exotic species were found on both sites, including *Bromus tectorum* and *Salsola tragus*. Skeletal remains of large shrubs, apparently sage (*Artemisia tridentata*) and cliffrose (*Purshia mexicana*) were noted.

Seed density in soil seed banks is 151 seeds/m² (14 seeds/ft²) at Site 1 and 192 seeds/m² (18 seeds/ft²) at Site 2. Seed bank species richness is low; five species were found in samples from Site 1 and eight were found in Site 2 samples. At both sites, seed banks are dominated by annual forbs (Brassicaceae) with traces of perennial forbs within the Asteraceae family. Only one grass species (*Muhlenburgia* spp.) emerged (Site 2).

Site characteristics suggest degradation of ecological integrity in two main forms: (1) low plant species diversity with communities dominated by pinyon and juniper trees, isolated shrub patches, and annual plants; (2) minimal soil O horizons, particularly beneath canopy openings. These conditions are presumably due to interactions of climate, anthropogenic activities including livestock grazing, and disruption of periodic fire cycles. Signs of extreme degradation, such as significant soil movement or high abundance of exotic plant species, were not present on either site. Due to the high tree density and continuity of fuels, the possibility exists for a high-intensity wildfire to occur in the area. Conditions found at the demonstration sites indicate that ecological restoration treatments are warranted.

IMPACTS OF PROPOSED ACTION

Parashant National Monument

The project would be visible from within the Monument. The relatively small project would not create a significant visual impact. Once the project was treated and burned, natural processes would start to reduce the visual contrast.

Air Quality

Some dust and smoke would be generated for a brief period. Small amounts of dust associated with vehicle traffic would be nearly undetectable. The prescribed burning would last one or two days. The relatively small size of the project would not contribute sufficient amounts to affect regional air quality. The ADEQ permit process would ensure compliance with air quality laws and regulations.

Cultural

This project is non-ground disturbing and is unlikely to adversely affect cultural resources.

Visual Resources

The Proposed Action would create small patches that would be lower in tree density than the surrounding area. There would be a brief period after the mechanical treatment, but before the prescribed burning, where tree slash/debris would be visible from nearby sites. Natural processes, particularly the development of diverse understories, would immediately begin to improve visual quality.

The project is consistent with visual resource management guidelines for the area. While very short-term slight changes to landscape form, color, and texture would likely occur, they would not exceed the current visual objectives for the long-term management of the treatment areas.

Noxious Weeds

Any of the noxious weeds in the area could be released by implementing the Proposed Action. Fire is an important disturbance factor and the ash from a fire makes a good seed bed. BLM would take action to eradicate any noxious weeds invading the project site, in accordance with standard operating procedures for any site on public lands. There would be no increase in noxious weeds as a result of implementing the Proposed Action.

Wildlife

Wildlife species would be temporarily disrupted during the treatment period, abandoning the specific project site. Some small vertebrates could be injured or killed as a result of the mechanical treatment or prescribed burning.

Reproduction of birds and small animals could be disrupted, delayed, or eliminated by the mechanical and burning treatments. Data collection could also disrupt reproduction in the short term. In subsequent years, post treatment the wildlife habitat values would be less likely to be diminished by wildfire.

No affect is anticipated to either bald eagles or California condors flying over or feeding in the subject area. Implementation of the Proposed Action would have no effect on any special status species.

The increase in vegetation community diversity and patchiness would improve habitat conditions for most species. This project is consistent with the Mt Trumbull HMP.

Soil

An increase in herbaceous cover associated with the reduction in tree density is expected to improve soil stability and reduce erosion. The soil O and A horizons are expected to be enhanced, returning them to within their ranges of natural variability.

Vegetation

A reduction in pinyon and juniper tree density and an associated increase in herbaceous vegetation is the primary anticipated result of this treatment. The area is considered to be outside its range of natural variability; this project would return the area to within that range. This change on a small area is not inconsistent with any other resource values: wildlife, soil, watershed, visual, or recreation.

There would be a slight reduction in the severity of a wildfire in the area.

No special status plant species would be affected by the implementation of the Proposed Action.

IMPACTS OF NO ACTION

Parashant National Monument

There would be no impact from the No Action Alternative. Actions and conditions within the Monument would continue in accordance with the Arizona Strip RMP and BLM Interim Guidance for Monuments.

Air Quality

There would be no increase in dust or smoke from selecting the No Action Alternative.

Cultural

There would be no direct impact to any cultural resources from selecting the No Action Alternative.

Visual Resources

The area would not be treated under the No Action Alternative; therefore there would be change to the visual quality of the area. In the event of a large wildfire, disease, or insect outbreak there would be an increased adverse impact on the visual quality of the area without this project.

Noxious Weeds

The area would not be treated under the No Action Alternative; therefore there would be change to the visual quality of the area. In the event of a large wildfire, disease, or insect outbreak there would be an increased adverse impact on the visual quality of the area without this project.

Wildlife

There would be no increase in open stands in the area. There would be no increase in wildlife habitat diversity of the woodlands from the Proposed Action. Without treatment, the existing wildlife habitat in the area would remain somewhat more at risk of destruction by catastrophic wildfire. If a catastrophic wildfire were to occur, the existing habitat for all species would be significantly altered. The duration of this alteration would be variable, but could last for many years for some species. The No Action Alternative is anticipated to have no effect upon either bald eagles or California condors flying over or feeding in the subject area.

Soil

High intensity burns leave the soils barren and sometimes hydrophobic, resulting in increased runoff and erosion. Where the heat is very high or long in duration, the soils may be sterilized for many years. There is a good possibility that a high intensity wildfire would spread through this area without treatment.

Vegetation

There would be no direct impact from the selection of the No Action Alternative. There would be an increase in the risk of severe wildfire without the project. The overstory would continue to fill in until fire, drought, disease, or combination of processes began to counter densification. Herbaceous understory species would continue to find it difficult to persist and communities would likely be reduced further.

CUMULATIVE IMPACTS

These are impacts that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions occurring in the same area of concern. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The primary activities affecting the project area are land management, recreation, and livestock grazing. The Bureau of Land Management administers the public lands in the area in accordance with the Arizona Strip RMP and various activity plans (grazing, wilderness, habitat). BLM actions in the area include fire suppression and ecological restoration treatments. Since 1995 BLM has implemented approximately 2,100 acres of restoration treatments as part of the Mt Trumbull Ponderosa Pine Ecosystem Restoration Project, with plans to treat approximately 2,500 additional acres. Additional treatments have been proposed on approximately 300 acres for aspen patches and meadows.

State and private lands in the area have been treated to convert pinyon-juniper woodlands to grasslands, as have public lands to the west of the proposed project site. These areas were converted using chaining and burning techniques, the equivalent of clear cuts in forestry, in an attempt to remove almost all trees.

Recreation, mostly in the form of hunting, camping, and sightseeing/driving for pleasure, is dispersed throughout the area and is based primarily on the areas natural values. Livestock grazing has occurred in the area for over one hundred years, and is the primary economic activity.

No individually insignificant, but cumulatively significant impacts are expected to occur as a result of implementing the Proposed Action. Due to the small size and limited impact of the project as proposed, there would be little, if any, effect on any resource.

Parashant National Monument

The BLM and NPS manage the Parashant National Monument in accordance with laws and policies that are designed to protect the resources and values for which it was established. The two agencies are in the process of developing a RMP/GMP that will further those purposes. The primary impact on the Monument will be in the form of a change in the visual resources when looking outside the Monument from certain locations. These changes are slight, consistent with VRM guidelines, and are not expected to change the quality of the visual experience.

Air Quality

Air quality is impacted by activity outside the project area, as well as by natural sources (dust). This project will not be discernable nor significantly affect air quality. Air quality is monitored by the Arizona Department of Environmental Quality, which is responsible for issuing permits for prescribed burning. When significant thresholds are reached, ADEQ restricts activity until levels abate.

Cultural

BLM manages cultural resources throughout the area in a manner to protect their scientific and social value. The impacts from this small project will be mitigated and are not expected to contribute to any

significant cumulative impact. BLM consults with the State Historic Preservation Officer in order to ensure that significant adverse impacts do not occur.

Visual Resources

The action area is designated as Visual Resources Class II, an area that has a high scenic quality. Management objectives in Class II allow subtle changes to the vegetation; changes may be seen but should not attract attention. See the discussion under Parashant National Monument.

Noxious Weeds

BLM takes aggressive action to eradicate noxious weeds in the area. Since this project is not anticipated to create any increase in noxious weeds, there would be no significant cumulative impact.

Wildlife

Large areas of wildlife habitat in the area are considered to be outside the range of natural variability due to the overdensification of woodland species and the loss of herbaceous plants. The Proposed Action would attempt to counter or reverse some of that and restore the area to more natural conditions. The Proposed Action would lead to a small increase in habitat diversity and ecosystem health, but would have no significant cumulative impact.

A significant negative short-term impact could result to nesting birds and small animals from mechanical and burning treatments conducted in spring and early summer. Therefore, no mechanical or prescribed fire treatments would be done in the spring or early summer.

Soil

Large areas of the surrounding pinyon-juniper woodland are considered to be outside the range of natural variability due to the overdensification of woodland species and the loss of herbaceous cover, leading to an increase in erosion and soil movement. High intensity burns leave the soils barren and sometimes hydrophobic, resulting in greatly increased runoff and erosion. Where the heat is very high or long in duration, the soils may be sterilized for many years. There is a good possibility that a high intensity wildfire would spread through the general area without treatment.

The Proposed Action would attempt to counter or reverse some of the conditions that have developed and restore the area to more natural conditions. The Proposed Action would lead to a small increase in ecosystem health, but would have no significant cumulative impact due to the small number of acres being treated in the region.

Vegetation

Large areas are considered to be outside the range of natural variability due to overdensification of woodland species and loss of herbaceous plants, despite efforts in the area to treat the vegetation to reduce the amount of woody plants. The Proposed Action would attempt to counter or reverse some of that and restore the area to natural conditions. The Proposed Action would lead to a small increase in plant diversity and ecosystem health, but would have no significant cumulative impact.

CONSULTATION AND COORDINATION

This EA was prepared by the Parashant National Monument/Arizona Strip Field Office of the Bureau of Land Management, 345 E. Riverside Drive, St. George, Utah 84790. Phone (435) 688-3200.

Gloria Bullets Benson, Native American Concerns
Bryan Bracken, Fire Management Officer
Hilary Boyd, Fire Ecologist
Whit Bunting, Range Management Specialist
Robert Davis, Forester
Timothy Duck, Ecologist, Lead Preparer
Tom Folks, Wilderness Specialist (Recreation)
Laurie Ford, Lands & Geological Sciences Team Lead
Andy Goheen, Prescribed Fire Specialist
Kathleen Harcksen, Renewable Resources
Michael Herder, Wildlife Team Leader
John Herron, Archeologist
Ray Klein, Parashant NPS
Ken Moore, Restoration Team Leader
Linda Price, Standards and Guides
Mike Small, Wildlife Biologist
Robert Smith, Watershed/Soil Scientist
Richard Spotts, Environmental Coordinator
Ron Wadsworth, Law Enforcement
LD Walker, Weed Specialist
Kari Yanskey, Botanist

The following agencies, groups, or individuals have been consulted with, or provided recommendations to this EA:

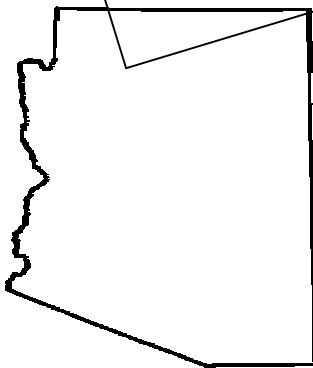
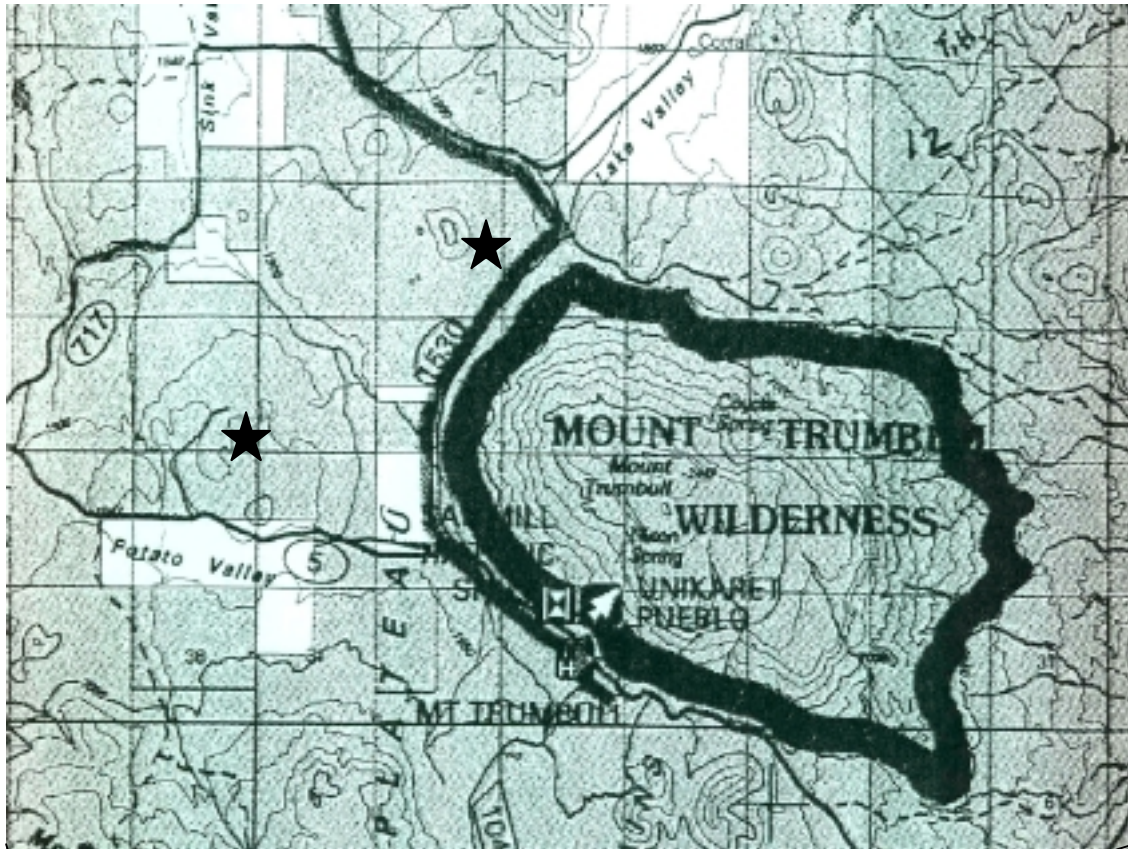
Grand Canyon Trust, Flagstaff Office
Northern Arizona University Ecological Research Institute

Notification of the availability of this EA was sent to the attached list of concerned publics on _____

NEPA Mailing List
Tribal Contacts Mailing List
Project Specific Mailing List

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Map of pinyon-juniper restoration demonstration sites (indicated by bold star symbols) near Mount Trumbull on the Grand Canyon-Parashant National Monument.

